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BY LIEUT JOHN R. IRWIN U. S. AIR SERVICE (RESERVE)

Insulating Materials.

The importance of good confluctors in electrical work, and especially in radio where high frequencies and high potentials are customarily used, has been shown in the preceding articles. It is, however, equally important to have nonconducting or insulating materials in order that electric currents may be confined to well defined and limited paths. Such materials are commonly called insulators, and when used in conjunction with condensers, dielectrics. In order to prevent the current from escaping along any bypath before the desired terminal point is reached, it is a familiar fact that electric wires are covered with layers of cotton, silk, rubber and other nonconducting compounds, and are

supported on porcelain knobs or in

Most insulating substances show a decrease in volume with increased temperature. These changes are irregular and sometimes rapid. They are not directly proportioned to the changes in temperature. Humidity is of great influence, and tends to lower the volume resistivity in such materials as slate, marble, bakelite and hard fiber.

Very frequently surface leak-age is of greater importance than volume conduction, and this sur-face leakage is largely dependent upon the moisture more readily than others. In any event care must be taken to insure that its effects are either eliminated or-

allowed for. (Continued in next issue.)

APPARATUS No DEVICES By RALPH BROWN, RADIO ENGINEER

The Homecharger.

Users of vacuum tubes often desire a battery charging device that can be charged from the house lighting facilities.

The "homecharging" device illustrated herewith is self-po-

larizing. The battery may be connected either way and it will always charge. There is no danger of reverse charging, ruined battery or burnt out recti-

ruined battery or burnt out rectifier. This is an unusual feature
and makes this device fool proof.

Another feature is, that operation stops and consumption of
current ceases immediately upon
disconnecting battery, which prevents dam ge to the charger
should leads become shorted.
Another good feature is that it
gives the battery a taper charge,
which is always recommended by
battery manufacturers.

Will readers interested in these radio articles kindly communicate ith the editor by mail?

To-day's Radio Programme.

Company, Schenectady, N.Y., 12.30 p.m. Noon stock market 12.40 p.m. Music.

Tuesday, October 3rd. 12.45 p.m. Weather forecast on Station WGY, General Electric 485 meters wavelength.



How Wobbling Tires Wear Themselves Out

They Are Simply Side-Supping All The Time

HOW OFTEN IT HAPPENS that one or both of the rear tires of the car ahead of yours is seen to wobble! Is it possible that the driver just behind you notices the same thing about your car? You very rarely gaze upon the rear of your own car, when it is moving, and perhaps it would be worth while to do this in order to find out if you have a "wobble" also, for a failure of a rear tire to run true and to confine its movement to the plane perpendicular to the road surface, is destructive to it and also wastes power. On firm-surfaced roads at ordinary speeds, unless on sharp curves, the tires have a pure rolling motion upon the road, without slippage and without the rubbing effect that accompanies it, but a wheel that wobbles is constantly side slipping its tire and "sandpapering" off its tread. Suppose a rear wheel, that does not run true, is jacked just off the garage floor and given a complete turn, it is easy to mark on the floor the extreme positions occupied by the outside of the tire, which is the amount by which it runs "out". Perhaps this is found to be three inches (which is by no means extreme) and since the car as a whole does not move from side to side, as the wheels turn, it is evident that this tire side slips on the road, three inches each revolu-tion. In the case of a \$2-inch wheel, which moves the car ahead practically 100 inches per revolution, the side slip is 3 per cent. of the forward movement, so that on a 100 mile trip, the effect of the wobbling on the tire would be equal to that which would have been produced if the wheel had side slipped or skidded a distance of about three miles—a rather striking fact and one that makes very clear why a wobbling wheel scuffs away its tire tread in a very short time. A tire may fail to run true simply because the rim which carries it is unevenly mounted on the felloe of the wheel, or is itself sprung, but this does not account for extreme cases of wobbling. These are generally attributable to the wheel itself being a warped surface—not a plane—or to its plane not being at right angles to its hub axis. The worst cases, however are the result of the bending out of line of the outside end of the axie shaft. so that the wheel is driven in a wobbly manner.

VALVE TIMING DATA

B. E. N. writes: I do repair work on a wide variety of cars and it often is difficult for me to tell whether their valve timing is correot. Where can I get a book that will give the timing of the engines on the various makes of cars? Answer: We cannot tell you

where you can obtain this data in beck form. As manufacturers occasionally alter the timing of their
engines and as new makes and
models are being brought out all
the time, it would be difficult to
embody this information in a book
which would remain correct and
up-to-date for very long. Some of
the motor car journals have published from time to time, very
helpful tables, giving the timing of
nearly all cars, arranged by years
and only authoritative source of
this information is the manufacturer. In other words, to find the
timing of any particular make or
model, consult the instruction book
which relates to it specifically.

R. 3. writes: Since replacing the
32x2 is inch fabric tires on my car
with \$3x4 inch cords, I have had
trouble from the freads of two of
them striking the fenders eccasionally, on rough roads—considerable
damage having already been done
to the rubber. What is the easiest
way out of this difficulty?

Answer: The easiest solution is
to install a rubber bumper between
mant of the body will be arrested
before it has gone far enough to
make the mudguard and tire touch,
but his would give your passengers occasional joits. As it is evident your springs must have
sagged considerably, the best remedy would be to install new ones
or to have the present ones reset
to a sufficient curvature—a thing
which a first-class spring maker
only can do successfully. If your
springs are fastened above the
axics, instead of underslung,"
the use of a metal block of suffcient height, between the spring
and the arits long spring
and the arits and extra long spring
and the arits and extra long spring book form. As manufacturers oc-



MUDGUARDS HIT TIRES

and the axie and extra long spring clips, should remove this trouble.

Questions of general interest to the motorist will be answered by Mr. Flough in this column, space permitting. If an immediate answer is desired, enclose self-addressed, stamped envelope.

Gilbert & Sullivan. DATES OF FALL FAIRS.

2.00 p.m. Music.

lessa Oct. 5-6.

Ended Life by Hanging Lindsay, Ont., Oct. 3 .- Bert Letts, Pair avenue, ended his own life, His body was found hanging in a stable at the rear of the house. The unfortunate victim left a note saying that no one was to bleme but him-

self, as he feared he might cause 6.00 p.m. Produce and stock harm to others. For some time past market quotations; news bulletins. | deceased was in hospital at Whit-7.45 p.m. Concert programme by, but returned home for the Lind-H.M.S. Pinafore, a comic opera by say fair last week. He is survived by a wife and one daughter.

If You Are

Too Tired to Eat Take Hood's Sarsaparilla. A well-known Justice of the Peace in Indiana says Hood's Sarsaparilla makes food taste good." After taking three bottles he ests 3 hearty meals a day, works hard and sleeps well.

A grateful woman writes: "I earnestly recommend all women who wish to be made new, or who are troubled with that tired feeling, to take Hood's Sareaparilla. It wonderfully relieved me of sour stomach, distress and belching."

Get Hood's, and only Hood's. Ass

There has been laid before the War

Reparations Commission a scheme whereby German labor shall be drafted for digging the long-projected tunnel beneath the English Channel, connecting Calais with Dover. The plan would render it practicable to get aboard a train in London and go straight through to Paris, thereby saving much time and avoiding water passage that is often extremely uncomfortable.

THE CHANNEL TUNNEL.

The distance from Dover to Calais is twenty-two miles. The proposed tunnel, however, would connect the London-Dover railway with the Calais-Paris line, and the total length of the passage underground would be thirty-two miles.

The tunnel-so obviously needed for freight traffic, as well as for the convenience of passenger transporta-tion—would have been dug long ago but for strong adverse popular sen-timent in England, where many people became panic-stricken at the notion that such a hole beneath the channel might invite invasion by a French army. This feeling held notwithstanding a proposition made by the French Government in 1885 to build part of the tunnel at the Calais end above water, so that British warships could, in case of war between the two countries, blow it to smithe-

The project, indeed, may be said to date back to the days of the first Napoleon. For in 1802 a French engineer suggested to him the idea of attempting an invasion of England by boring a hole under the channel. The great Corsican thought the matter over, but decided that the plan

was hopelessly visionary.

Nevertheless, in 1869 the Calaisto-Dover tunnel was actually begun, and \$600,000 was spent in digging shafts at both ends. It was planned at that time to propel trains through it by compressed air, in order to avoid the smoke of steam locomotives, and a scheme was partly worked out for employing the tides to furnish power for the purpose. Nowadays, of course, there would be no difficulty of this sort, inasmuch as the electric locomotive would solve the problem satisfactorily.

All the plans for the tunnelwhich eventually, it is likely, will be twinned-were made and completed long ago. As an engineering enterprise it does not offer any very extraordinary difficulties. If the bottom of the English Channel were of unsubstantial material, mud or silt, the job would be one of a most troublesome character; but, as a matter of fact, it is a smooth floor of chalk, swept clean by the rapid current passing through it from the North

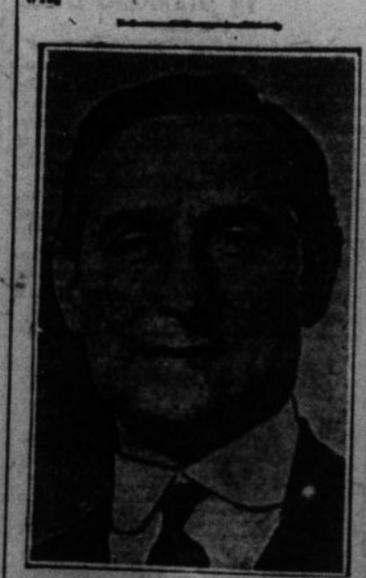
The stratum of chalk is over 200 feet thick. It affords material of great density and uniform consistency, yet easy to bore through, and watertight. It is reckoned that a tunnel eighteen feet in diameter can be dug by machinery at a rate of nearly four miles a year. To finish it will take five years, and the cost will be about \$2,000,000 a mile. The total expenditure should not exceed \$77,000,000, and returns from traffic ought to yield at least 6 per cent. to investors in the enterprise.

Oilcloth Fishing Boats, The oldest form of fishing boat is the coracle, which is still used by Ashermen in the Cardigan district of West Wales.

Coracles were used by the ancient Britons. They are very fragile, being made by covering a wicker framework with leather or oilcloth. They hold one man only and are propelled by means of a hand paddle. When fishing, two of these craft work together with a net slung between

At the present moment coracle users are disturbed by the Fisheries net licenses issued and empowers fishing boards to select the individuals to whom licences may be granted. If this act passes Parliament, they declare, coracle fishing will be-

Repartee is the highest order of



Viceroy of India, is strongly attacked by democrats of that country for his ititude on the press bill, designed to rotect native prince.

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